

CLAIMS

1. A protective circuit having hot, neutral, and ground leads arranged to be placed between corresponding hot, neutral, and ground leads of a power utility outlet and corresponding hot, neutral, and ground leads of electrical apparatus, said protective circuit comprising:

a voltage surge protection circuit connected between the hot and neutral leads, comprising:

first and second voltage surge protectors connected in series between the hot and neutral leads,

said first and second voltage surge protectors being connected at a common connection to each other;

a first relay connected between the hot and neutral leads of the protective circuit and controlling a first relay switch arm which connects the neutral lead of the power utility outlet and the neutral lead to the electrical apparatus when the first relay is receiving current, said first relay receiving current when the ground lead is connected to an electrical ground, and said first relay switch arm opening when current in the first relay circuit is not received to protect the electrical apparatus and the voltage surge protectors of the voltage surge protector circuit when the ground lead is not connected to an electrical ground.

2. The protective circuit of claim 1, further including:

a capacitor connected between said common connection of said first and second voltage protectors in said voltage surge protection circuit and said neutral lead, said capacitor having a farad rating to filter substantially all noise signals on said neutral lead to ground when said ground lead of said circuit is connected to electrical ground through said first relay switch arm.

3. The protective circuit of claim 2, further including:

a voltage threshold sensing circuit for detecting when the voltage on the hot lead of the power utility outlet exceeds an established protective level;

a relay supply switch for providing current to the relay circuit; and

an electronic switch responsive to the voltage threshold sensing circuit for disabling the relay supply switch and protecting the electrical apparatus when the voltage between the hot lead and the neutral lead of the power utility outlet exceeds an established protective level.

4. The protective circuit of claim 1, further including:

a voltage threshold sensing circuit for detecting when the voltage between the hot lead and the neutral lead of the power utility outlet exceeds an established protective level;
a relay supply switch for providing current to the relay circuit; and
an electronic switch responsive to the voltage threshold sensing circuit for disabling the relay supply switch and protecting the electrical apparatus when the voltage between the hot lead and the neutral lead of the power utility outlet exceeds an established protective level.

5. The protective circuit of claim 1, further including:

a voltage threshold sensing circuit for detecting when the voltage on the hot lead of the power utility outlet exceeds an established protective level;
a relay supply switch for providing current to the relay circuit;
an electronic switch responsive to the voltage threshold sensing circuit for disabling the relay supply switch and protecting the electrical apparatus when the connection between the ground lead is disconnected.

6. The protective circuit of claim 1, further including:

a voltage threshold sensing circuit for detecting when the voltage on the hot lead of the power utility outlet exceeds an established protective level;
a relay supply switch for providing current to the relay circuit;
an electronic switch responsive to the voltage threshold sensing circuit for disabling the relay supply switch and protecting the electrical apparatus when the connection between the hot and neutral lead is reversed.

7. The protective circuit of claim 1, wherein:

said first relay receives current when the hot lead and the neutral lead are properly connected and not receiving current when connection between the hot lead and the neutral lead is reversed, said first relay switch arm opening when current in the first relay circuit is not received to protect the electrical apparatus and the voltage surge protectors of the voltage surge protector circuit when the connection between the hot lead and the neutral lead is reversed.

8. The protective circuit of claim 1, further including:

a second relay connected between the hot and neutral leads of the protective circuit and controlling a second relay switch arm in a conductor connecting the hot lead of the power utility outlet to the hot lead of the electrical apparatus when the second relay is receiving current, said second relay receiving current when the ground lead is connected to an electrical ground, said second relay switch arm opening when current in the second relay circuit is not received to protect the electrical apparatus and the voltage surge protectors of the voltage surge protector circuit when the ground lead is not connected to an electrical ground.

9. The protective circuit of claim 1, further including:

a second relay connected between the hot and neutral leads of the protective circuit and controlling a second relay switch arm in a conductor connecting the hot lead of the power utility outlet to the hot lead of the electrical apparatus when the second relay is receiving current, said second relay receiving current when the hot lead and the neutral lead are properly connected and not receiving current when connection between the hot lead and the neutral lead is reversed, said second relay switch arm opening when current in the second relay is not received to protect the electrical apparatus and the voltage surge protectors of the voltage surge protector circuit when connection between the hot lead and the neutral lead is reversed.

10. A protective circuit having hot, neutral, and ground leads arranged to be placed between corresponding hot, neutral, and ground leads of a power utility outlet and corresponding hot, neutral, and ground leads of electrical apparatus, said protective circuit comprising:

a voltage surge protection circuit connected between the hot and neutral leads, comprising:

first and second voltage surge protectors connected in series between the hot and neutral leads,

said first and second voltage surge protectors being connected at a common connection to each other;

a first relay connected between the hot and neutral leads of the protective circuit and controlling a first relay switch arm which connects the neutral lead of the power utility outlet and the neutral lead of the electrical apparatus when the first relay is receiving current, said first relay

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receiving current when the hot lead and the neutral lead are properly connected and not receiving current when connection between the hot lead and the neutral lead is reversed, said first relay switch arm opening when current in the first relay circuit is not received to protect the electrical apparatus and the voltage surge protectors of the voltage surge protector circuit when the connection between the hot lead and the neutral lead is reversed.